The Impact of Labels and Preconceptions on Ohio State Students' Food Buying Habits

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Abstract

The purpose of this study was to discover why students at The Ohio State University, aged 18-23, choose to buy certain food products. It aimed to determine if preconceptions about agriculture or food labels influence student consumer habits. Learning about students' opinions can allow agricultural companies to better market and create products for this demographic. According to Lundy et. al. (2018), who examined college millennials' beef labeling views, millennials worried about beef production's environmental impact. In terms of thoughts on labeling, participants wanted more "transparency." Although this study was focused more broadly, it served to gauge college-aged consumer's views on food products.

In this study, the researchers used an online Qualtrics survey (28 questions) to assess participants' underlying perceptions and opinions of agriculture. The questions were Likert scale, open response, and multiple-choice formats. To recruit study participants, the survey was presented by the undergraduate researcher to four classes in the autumn and two in the spring at Ohio State. Flyers were posted in 18th Avenue Library and the Ohio Union. The researchers used SPSS software to conduct statistical tests, such as Descriptive Frequencies, One-way ANOVA tests, and one Nonparametric test. Four qualitative responses were analyzed by categorizing answers into themes.

There were 74 responses. More than half (52.7%) of participants indicated they would be willing to pay 5% more for organic foods. The data also showed that 26% of participants followed one or a combination of eating regimens. Data also indicated that 82.4% agreed to some degree that "Farmers are trustworthy," while 52.8% disagreed to some degree that "Pesticides are safe." In terms of qualitative data, there were various responses. When defining the term "organic" in an open-ended response, answers ranged from "no pesticides" to "non-GMO."

The results suggest students are hesitant about some agricultural practices, as well as choosing some food products. Qualitative responses also suggest lack of understanding of some agricultural practices and food labels. With this information, agricultural communicators should continue focusing on using the farmer to address consumer concerns—since consumers indicated they trust farmers.

Introduction

Currently, there are rising trends in the food industry regarding transparency. Since consumers want more information regarding food production processes, certain food labels have emerged. Due to shifting preferences, agriculturalists and food producers need to be aware of consumers' thoughts regarding food labels and agriculture in general.

With food labels, there are several basic labels consumers look for when grocery shopping. One of these labels is organic. In fact, "two thirds of U.S. consumers say that they use organic products," and "27% of them also say that they are weekly users of organic products," (McReynolds et al. 2018, p. 48). A food production method that has been questioned by consumers is genetically modified (GM) foods. Scott et al. (2018) explored consumers' opinions regarding these foods. The findings showed differences in opinions between scientists and lay people in developed countries. These lay people thought of, "genetically engineered food as dangerous and offering few benefits," (Scott et al. 2018, p. 459). According to Scott et, al. (2018), many also had moral issues with these types of food. These opinions, or similar ones, can cause consumers to look for "non-GMO" labels while shopping. Gluten-free (GF) is another label that has recently increased in popularity. In a recent study, Prada et. al. (2019) found many consumers did not understand GF products, yet still reported having positive beliefs about the GF diet.

Many consumers seem to be looking for certain labels but may have a lack of understanding about what labels mean and the agricultural practices involved. It has been noted that many Americans, since they are not on farms, do not always understand farming practices. In fact, past United States Secretary of Agriculture Tom Vilsack noted that 98% of U.S. citizens are generations removed from agriculture (Henneman et al. 2018). Visack said, "The reality is so many Americans are so far removed from where their food comes from. They may be three, four generations removed" (USDA, 2014).

With this being said, college students, which may be a generation even more removed from agriculture, could influence the future of the food industry. In fact, 9.9% made up the 18-24 year range in the U.S. 2010 census, with an increase of 13% from 2000 (Howden & Meyer, 2011). This demographic is widely known as Generation Z or Gen Z. According to Su et al. (2019, p. 2), this group represents "nearly 74 million people in the United States." This demographic has more knowledge about sustainability, and they tend to be more eco-friendly as well (Su et al. 2019, p. 2). They have also been found to "prioritize health when making food choices" (Su et al. 2019, p. 2).

The purpose of this study was to discover why The Ohio State University students choose to buy certain food products and to learn whether or not these buying habits will continue in the future. It also aimed to determine if underlying preconceptions about agriculture or food labels cause these students to buy certain types of food. This research project will use data to describe these buying habits and motivations, which could be used to guide future research and inform marketing decisions for the agriculture industry.

Review of Literature

Consumer behaviors

According to Rödiger and Hamm (2015), the consumer decision process involves the following steps: "need recognition, information search, evaluation of alternatives, purchase decision, and post-purchase behavior" (p. 11). These steps influence consumers' behaviors and buying patterns. In terms of deciding what to buy, beliefs about prices, price evaluation, and price perception also play a role in consumer's purchasing habits (Rödiger & Hamm, 2015). The researchers also noted, behavior intentions, with price, can also lead to "purchase intentions" (Rödiger & Hamm, 2015). Cavalcanti et. al. (2013) found the Behavioral Perspective Model (BPM) a "useful framework" to determine consumer behavior. BPM is based on behavior principles derived from behavior analysis, behavioral economics, and marketing (Cavalcanti et. al. 2013). From this compiled research, it seems that price plays a prominent role in consumer buying.

Another study found more information regarding college students' food buying habits related to organic labels. According to McReynolds et al. (2017), college-aged students "do consider purchasing organic food" (p. 54). In fact, the study found that only 12% of college students revealed they made no organic food purchases (McReynolds et al., 2017). The barriers for not purchasing organic foods included cost and availability, but the researchers noted "culture and socioeconomic status" could also influence organic purchasing behaviors (McReynolds et al., 2017, p. 54).

Food advertising and consumers

Marketing has also been found to play a vital role in consumerism. Brand imagery, characters, seals and endorsements, claims, labels, etc. affect how consumers choose their foods at the grocery store (Chandon, 2013). According to Chandon (2013), "the biggest advantage of packaging is that, unlike traditional advertising, it reaches people at the time of purchase and of consumption, the two critical 'moments of truth'" (p. 8). According to Lwin (2015), research found food marketing is in need of policy intervention. The studies' findings also produced an obvious need for community-based education programs (Lwin, 2015). The research noted large misuse of packaging and labels, (although, in some cases, it can be used to help some consumers better understand food) which can in turn lead to false health claims (Lwin, 2015).

Consumers' agricultural opinions

Not only can misunderstanding food labels lead to consumer misconceptions, but also a lack of understanding of agricultural practices. Many consumers have concerns regarding GM and organic foods, as well as environmental concerns.

Ruth and Rumble (2019) explored consumer's opinions of GM foods in "Consumers' Evaluations of Genetically Modified Food Messages." The study found that the majority of Florida residents surveyed thought that "GM foods have not been adequately investigated." It was also found that the next major attitude was that GM foods have some risk. In this study, the participants were 18 and older. Another study concerning GM foods revealed the majority of

scientists supporting GM foods, but lay people having moral concerns in Western society (Scott et al., 2018, p. 474). The study also notes, "in some respects genetically engineered (GE) food may serve sustainability by reducing the amount of land that has to be devoted to agriculture," which could influence opinions due to the growing interest in environmental efforts (Scott et. al. 2018). Ruth and Rumble's (2019) study also indicates Florida residents of all ages wanting to know more about GM products or having some doubts. Ruth and Rumble (2019) demonstrate that there are some prominent preconceptions about food labels that consumers consider before buying their food.

Another study examined college millennials' views on beef labeling and perceptions behind those labels (Oesterreicher et al. 2018). Focus groups and questionnaires were used to determine beef preconceptions of the participants. It found that these millennials worried that beef production has a negative impact on the environment, as well as large-scale farms. In terms of thoughts on marketing (including labeling), participants wanted more "transparency" from the beef industry. Participants had strong views about how these companies should be marketing beef, and what information they should be sharing.

Gaps in current research

Although all of these studies reveal some consumer opinions and patterns, there is not a great deal of information on college students' opinions on a wide array of food products and labels, as well as agricultural practices. More research can be done to determine perceptions from this demographic. This information will serve to help agriculturalists and food manufacturers better understand this age group's interests.

Procedures and Methods

Sampling

The population for this study included The Ohio State University college students, ages 18-23. The majority of participants were female (73%), while males comprised 25.7% of participants, and 1.5% did not disclose their gender. Although other options were listed on the survey, no other gender identities were disclosed. The largest participant grade level group was Two at 33.8%. Level Two roughly corresponds to sophomore or second-year students. For the other grade levels, 21.6% were One (freshman or first-year), 12.2% were Three (junior or third-year), and 32.4% were Four (senior or fourth-year or above). In regard to ethnicity, the highest percentage was White at 77%. Additional percentages can be found in the table below.

Table 1: Participant Ethnicity

	n	*%*
Asian / Pacific Islander	8	10.8
Black or African American	4	5.4

Black or African American,White	1	1.4
Hispanic or Latino	2	2.7
Hispanic or Latino,White	2	2.7
White	57	77.0

The largest surveyed major was Animal Sciences at a total of 16.3%. Additional numbers and percentages regarding participants' major can be found below in Table 2.

Table 2: Participant Major

	n	*%*
Accounting	1	1.4
Agricultural Communication	3	4.1
Agribusiness and Applied Economics	2	2.7
Agriscience Education	1	1.4
Animal Sciences	9	12.2
Animal Sciences - Animal Industries	2	2.7
Animal Sciences - Biosciences	1	1.4
Athletic Training	1	1.4
Biological Engineering	1	1.4
Biology	2	2.7
Biomedical Engineer	1	1.4
Civil Engineer	1	1.4
Community Leadership	1	1.4
Communications	2	2.7
Computer Science and Engineering	2	2.7
Environment, Economy, Development, and Sustainability	1	1.4

Economics	1	1.4
Engineering	1	1.4
English	4	5.4
Entomology	1	1.4
Finance	2	2.7
Food Business Management	2	2.7
Food Science and Technology	3	5.4
History, Political Science	1	1.4
Human Development and Family Science	1	1.4
Human Nutrition	1	1.4
Interior Design	1	1.4
Marketing	1	1.4
Mathematics	1	1.4
Music Education	1	1.4
Neuroscience	1	1.4
Natural Resource Management	1	1.4
Pharmaceutical Sciences	1	1.4
Political science	1	1.4
Pre-med Communication	1	1.4
Psychology	2	2.7
Public Health	1	1.4
Public Policy	1	1.4
Public Policy Analysis	2	2.7
Sociology	1	1.4

Spanish	1	1.4
Strategic Communications	2	2.7
Sustainable Plant Systems	1	1.4
Sustainable Plant Systems - Plant Biosciences	1	1.4
Undecided	1	1.4
Writing, Rhetoric, Literacy	1	1.4
No response given	2	2.7

The sample can be defined as a convenience sample because instructors, known by the undergraduate researcher, helped to share the survey. The undergraduate researcher contacted these Ohio State instructors for consent to present researcher flyers to the class. In the autumn 2019 semester, the researchers received documentation to share the survey from the following instructors: Thomas Stewart (AGRCOMM 3130 - Oral Expression in Agriculture), Christianne Buuck (ENGLISH 1110.03 - First-Year English Composition and ENGLISH 4150 - Cultures of Professional Writing), Beverly Moss (ENGLISH 3467S - Tutoring Writing) and Alyssa Rockers (AGRCOMM 2367 - Agricultural Issues in Contemporary Society). A total of 196 students received the invitation in the autumn semester. In the spring 2019 semester, the undergraduate researcher visited the following classes: Thomas Stewart (AGRCOMM 3130 - Oral Expression in Agriculture), and Christianne Buuck (ENGLISH 1110.03 - First-Year English Composition, ENGLISH 1109 Intensive Writing and Reading, and ENGLISH - 3304 Business and Professional Writing). The total number of students who received an invitation to participate was 119 in the spring semester. In total, 315 undergraduate students were invited to complete the research survey. Both semesters, follow-up emails were also sent to instructors to pass along to their students if they were comfortable. Sampling was also a convenience sample based on physical proximity: The undergraduate researcher hung flyers in the Ohio Union and in the 18th Avenue Library.

In terms of responses, 74 responses were analyzed by researchers. It should be noted that some original responses were deleted due to skipped questions or participants being the wrong grade level.

It should be noted that with the sponsor's funding, incentives will be sent to participants who provided their email at the end of the survey.

Instrumentation

To gather results, the researcher distributed an online survey through Qualtrics. This survey was created by referring to the two referenced articles, as well as input from the

undergraduate researcher, primary investigator, and the sponsor to establish face and content validity for the survey instrument. The articles were "Consumers' Evaluations of Genetically Modified Food Messages" (Ruth & Rumble 2018) and "Collegiate Millennials' Perceptions of Locally Produced Beef" (Oesterreicher et. al. 2018). The survey, which included a total of 28 questions, was used to assess participants' underlying perceptions and opinions of agriculture. The question types were Likert scale (seven-point), open response, and multiple choice. The questions in the survey aimed to discover if these young adults choose their groceries based on their food labels (i.e., "non-GMO," "organic," "all-natural," "vegan," etc.). The survey also aimed to determine if choosing food with these labels is due to negative preconceptions about agriculture, insufficient knowledge about the industry, or personal choice. No personal questions were asked on the survey.

The researchers used SPSS software to analyze the quantitative data using descriptive frequencies tests, one-way ANOVA statistical tests, and one non-parametric statistical test. To analyze the four qualitative responses, the undergraduate researcher categorized common answers into themes.

Participants' names were not connected to data and data was saved on BuckeyeBox, as well as a password protected computer. Data was only accessible to the three researchers. In terms of privacy and confidentiality, the researchers took out identifying information from the data set. However, the emails will be saved to inform participants if they won an incentive. All identifiers will be removed from the survey data and kept in a separate document. The principal investigator, the research advisor, will retain data for the required seven years.

IRB Approval

Before beginning the study, researchers submitted an exempt IRB application to The Ohio State University IRB, which was approved. However, an amendment was made to continue the research into the spring semester. Once the amendment was made and approved, the researchers continued the survey into the spring semester. The final IRB number was 2020E0029.

Results

Quantitative Results

Descriptive Statistics for Likert Questions

For the first question, "Pesticides are safe," the highest percentage (20.3%) disagreed. The majority (52.8%) disagreed (somewhat disagree, disagree, strongly disagree) that "Pesticides are safe."

Table 3: Descriptive Statistics for Question 1

	n	*%*

Strongly agree	5	6.8
Agree	13	17.6
Somewhat agree	11	14.9
Neither agree nor disagree	6	8.1
Somewhat disagree	13	17.6
Disagree	15	20.3
Strongly disagree	11	14.9

For the second question, "Farmers are trustworthy," the highest percentage (31.1%) agreed. The majority (82.4%) agreed (somewhat agree, agree, strongly agree).

Table 4: Descriptive Statistics for Question 2

	n	*%*
Strongly agree	18	24.3
Agree	23	31.1
Somewhat agree	20	27.0
Neither agree nor disagree	9	12.2
Somewhat disagree	3	4.1
Disagree	0	0.0
Strongly disagree	1	1.4

For the third question, "Large farms are better for keeping up with modern food demands," the highest percentage (35.1%) agreed. The majority (70.3%) agreed (somewhat agree, agree, strongly agree).

Table 4: Descriptive Statistics for Question 3

	n	*%*
Strongly agree	7	9.5

Agree	26	35.1
Somewhat agree	19	25.7
Neither agree nor disagree	4	5.4
Somewhat disagree	5	6.8
Disagree	12	16.2
Strongly disagree	1	1.4

For the fourth question, "Modern agriculture uses safe technology," the highest percentage (27%) agreed. The majority (62.2%) agreed (somewhat agree, agree, strongly agree).

Table 5: Descriptive Statistics for Question 4

	n	*%*
Strongly agree	13	17.6
Agree	20	27.0
Somewhat agree	13	17.6
Neither agree nor disagree	13	17.6
Somewhat disagree	7	9.5
Disagree	6	8.1
Strongly disagree	2	2.7

For the fifth question, "Farms are largely family owned in the United States," the highest percentage (28.4%) somewhat agreed. The majority (58.1%) agreed (somewhat agree, agree, strongly agree).

Table 6: Descriptive Statistics for Question 5

	n	*%*
Strongly agree	12	16.2
Agree	10	13.5

Somewhat agree	21	28.4
Neither agree nor disagree	6	8.1
Somewhat disagree	9	12.2
Disagree	9	12.2
Strongly disagree	7	9.5

For the sixth question, "Farming is sustainable," the highest percentage (27%) somewhat agreed. The majority (70.3%) agreed (somewhat agree, agree, strongly agree).

Table 7: Descriptive Statistics for Question 6

	n	*%*
Strongly agree	15	20.3
Agree	17	23.0
Somewhat agree	20	27.0
Neither agree nor disagree	8	10.8
Somewhat disagree	8	10.8
Disagree	4	5.4
Strongly disagree	2	2.7

For the seventh question, "Genetically modified foods are safe," the highest percentage (31.1%) strongly agreed. The majority (71.6%) agreed (somewhat agree, agree, strongly agree).

Table 8: Descriptive Statistics for Question 7

	n	*%*
Strongly agree	23	31.1
Agree	16	21.6
Somewhat agree	14	18.9

Neither agree nor disagree	5	6.8
Somewhat disagree	6	8.1
Disagree	6	8.1
Strongly disagree	4	5.4

For the eighth question, "Conventionally grown foods are just as healthy as organically grown foods," the highest percentage was tied at 28.4% for strongly agree and agree. The majority (73%) agreed (somewhat agree, agree, strongly agree).

Table 9: Descriptive Statistics for Question 8

	n	*%*
Strongly agree	21	28.4
Agree	21	28.4
Somewhat agree	12	16.2
Neither agree nor disagree	6	8.1
Somewhat disagree	9	12.2
Disagree	5	6.8
Strongly disagree	0	0.0

For the ninth question, "Meatless diets are more sustainable," the highest percentage (17.6%) strongly agreed. Yet, the highest percentage (44.6%) disagreed (somewhat disagree, disagree, strongly disagree). See table 10 for full results.

Table 10: Descriptive Statistics for Question 9

	n	*%*
Strongly agree	13	17.6

Agree	11	14.9
Somewhat agree	6	8.1
Neither agree nor disagree	11	14.9
Somewhat disagree	12	16.2
Disagree	12	16.2
Strongly disagree	9	12.2

For the tenth question, "A vegan lifestyle provides all necessary nutrients," the highest percentage (17.6%) was neutral. The highest percentage also (47.3%) disagreed (somewhat disagree, disagree, strongly disagree).

Table 11: Descriptive Statistics for Question 10

	n	*%*
Strongly agree	8	10.8
Agree	10	13.5
Somewhat agree	8	10.8
Neither agree nor disagree	13	17.6
Somewhat disagree	15	20.3
Disagree	9	12.2
Strongly disagree	11	14.9

One-way ANOVAs, Nonparametric, and Likert Constructs

To determine if differences exist among grade levels for each construct, ANOVAs were run on three Likert constructs, namely Food Safety, Farm Feelings, and Food Sustainability. The dependent variable was the chosen Likert construct, and grade level was the independent variable. The alpha level was set *a priori* at .05.

The descriptive statistics for the three Likert constructs, including mean and standard deviation, can be found in the table 12.

Table 12: Descriptive Statistics for Questions 1-10

	Food Safety	*Farm Feelings*	*Food Sustainability*
Mean	3.4234	3.0856	3.3750
Median	3.5000	3.0000	3.2500
Mode	3.67[a]	2.33	2.75
Std. Deviation	1.46631	1.13350	1.31199
Sum	253.33	228.33	249.75

The first construct, the Food Safety Construct, included the following items: "Pesticides are safe," "Modern agriculture uses safe technology," and "Genetically modified foods are safe." Grade was not found to be a significant predictor of participant thoughts regarding food safety [$F(3, 70) = 0.295$, $p = 0.829$].

Visual analysis of the histogram and Q-Q plot supported the normality assumption for the Farm Feelings and Food Sustainability Constructs. However, visual analysis of the histogram and Q-Q plot did not support the normality assumption for the Food Safety Construct. A Kruskal-Wallis One-way ANOVA Nonparametric test also did not support the normality assumption for the food safety construct. The Kruskal-Wallis test replaced the ANOVA above for the Food Safety construct. Since normality was not met, the non-parametric test was run to determine if differences existed between the grade level.

Figure 1: Food Safety Nonparametric Test

Hypothesis Test Summary

	Null Hypothesis	Test	Sig.	Decision
1	The distribution of Food_safety is the same across categories of Grade.	Independent-Samples Kruskal-Wallis Test	.910	Retain the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

The second construct, the Food Sustainability Construct, included the following items: "Conventionally grown foods are just as healthy as organically grown foods," "A vegan lifestyle provides all necessary nutrients," "Meatless diets are more sustainable," and "Farming is

sustainable." Both the vegan lifestyle and meatless diet questions were recorded into new variables due to the fact that the wording was the opposite of the other statements. Grade was not found to be a significant predictor of participant thoughts regarding food sustainability [$F(3, 70) = 0.962$, $p = 0.416$].

Table 14: ANOVA of Food Sustainability Construct

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	4.973	3	1.658	0.962	0.416
Within Groups	120.683	70	1.724		
Total	125.656	73			

The third construct, the Farm Feelings Construct, included "Pesticides are safe," "Modern agriculture uses safe technology," and "Genetically modified foods are safe." Grade was not found to be a significant predictor of participant thoughts regarding farm opinions or attitudes [$F(3, 70) = 1.567$, $p = 0.205$].

Table 15: ANOVA for Farm Feelings Construct

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	5.903	3	1.968	1.567	0.205
Within Groups	87.888	70	1.256		
Total	93.791	73			

Descriptive Statistics for Organic-Related Questions

In the first organic eating question, participants were asked, "On a scale of 1-5 (1 being very important and 5 being least important), how important is buying an organic food label for you?" The highest percentage answered, "least important" or "5" (39.2%), and the next highest answered "3" (25.7%). In addition, 12.2% answered "1," 13.5% answered "2," and 9.5% answered "4."

Table 16: : Descriptive Statistics for Question 11

	n	*%*
1	9	12.2
2	10	13.5
3	1	1.4
3	18	24.3
4	7	9.5
5	29	39.2

The second question about organic eating asked participants, "If you were buying organic foods, how much more would you be willing to pay? (Compared to conventionally produced foods.)" The participants could choose 5%,10%, 15% or other. More than one option could be chosen. The highest percentage of respondents chose they would pay 5% more, with a total of 52.7% of responses. The second highest percentage of participants indicated participants would pay 10% more with a total of 21.6% of the responses. The third highest response was "other," which was 20.3% of participants. Most answers in this field were "0%." The additional answers comprised 2.7% or less of participants.

Table 17: Descriptive Statistics for Question 11

	n	*%*
10%	16	21.6
10%,15%	1	1.4
15%	1	1.4
5%	39	52.7
5%,Other:	2	2.7
Other:	15	20.3

Descriptive Statistics for Food Labels Question

The most frequent response was "Other" at 12.2%. The majority of these responses included fill-in answers such as, "Sale," "None," or "Allergy Information." The highest percentage other than "Other" was "Locally grown" at 9.5%. The next highest was "Sugar-free" at 5.4%. It should also be noted that 4.1% did not answer. 5.4% selected both "Locally grown"

and "Sustainably produced." The rest of the percentages were combinations of several labels. See table 18 below.

Table 18: Descriptive Statistics for Question 17

	n	%
No response	3	4.1
All-natural	1	1.4
Dairy-free	1	1.4
Dairy-free,Antibiotic	1	1.4
Dairy-free,Sugar-free	1	1.4
Free-range,Grass-fed	1	1.4
Free-range,Grass-fed,Sustainably-produced	1	1.4
Free-range,Hormone-free,Grass-fed	1	1.4
Gluten-free	1	1.4
Gluten-free,All-natural,Hormone-free	1	1.4
Gluten-free,Dairy-free,Sugar-free,Antibiotic,Free-range	1	1.4
Locally-grown	7	9.5
Locally-grown,All-natural	2	2.7
Locally-grown,Antibiotic,Hormone-free,Grass-fed	1	1.4
Locally-grown,Dairy-free,All-natural,Sugar-free,Antibiotic,Free-range,Sustainably-produced	1	1.4
Locally-grown,Dairy-free,All-natural,Sugar-free,Free-range,Hormone-free,Grass-fed	1	1.4
Locally-grown,Dairy-free,All-natural,Sustainably-produced	1	1.4
Locally-grown,Dairy-free,Free-range	1	1.4
Locally-grown,Dairy-free,Hormone-free,Grass-fed,Sustainably-produced	1	1.4
Locally-grown,Dairy-free,Sugar-free,Antibiotic,Free-range,Hormone-free,Grass-fed,Sustainably-produced	1	1.4

Locally-grown,Free-range	1	1.4
Locally-grown,Free-range,Hormone-free,Grass-fed	1	1.4
Locally-grown,Gluten-free,Dairy-free,Sugar-free,Free-range,Hormone-free,Grass-fed,Sustainably-produced	1	1.4
Locally-grown,Hormone-free	1	1.4
Locally-grown,Non-GMO,Dairy-free,Other:	1	1.4
Locally-grown,Non-GMO,Organic,All-natural,Hormone-free,Grass-fed	1	1.4
Locally-grown,Non-GMO,Organic,All-natural,Sugar-free,Hormone-free,Sustainably-produced	1	1.4
Locally-grown,Non-GMO,Organic,Dairy-free,All-natural,Antibiotic,Free-range,Hormone-free,Grass-fed,Sustainably-produced	1	1.4
Locally-grown,Organic	1	1.4
Locally-grown,Organic,Free-range,Hormone-free,Grass-fed	1	1.4
Locally-grown,Organic,Sugar-free,Free-range	1	1.4
Locally-grown,Organic,Sugar-free,Free-range,Grass-fed,Sustainably-produced	1	1.4
Locally-grown,Other:	1	1.4
Locally-grown,Sugar-free	3	4.1
Locally-grown,Sustainably-produced	4	5.4
Non-GMO,Gluten-free,Dairy-free,All-natural,Sugar-free	1	1.4
Non-GMO,Gluten-free,Sugar-free,Free-range	1	1.4
Non-GMO,Organic,All-natural,Free-range,Grass-fed	1	1.4
Non-GMO,Organic,All-natural,Sugar-free,Antibiotic,Free-range,Hormone-free,Sustainably-produced	1	1.4
Non-GMO,Organic,Gluten-free,Free-range,Hormone-free,Grass-fed	1	1.4
Organic,All-natural	1	1.4
Organic,All-natural,Sugar-free	2	2.7
Organic,Dairy-free	1	1.4

Organic,Sustainably-produced	1	1.4
Other:	9	12.2
Sugar-free	4	5.4
Sugar-free,Free-range,Sustainably-produced	1	1.4
Sustainably-produced	1	1.4

Descriptive Statistics for Eating Regimen Question

Another survey question asked participants, "Do you follow any of the following eating regimens? Please check all that apply." The highest percentage (74.3%) did not check any boxes, which indicated they did not follow any of the eating regimens. Of those that answered, the highest percentages were "Dairy-free" (4.1%), "Vegetarian" at 4.1%, and "Whole 30" at 4.1%. Table 19 below shows the additional percentages.

Table 19: Descriptive Statistics for Question 18

	n	**%**
No response (These participants do not follow any of these eating regimens.)	55	74.3
Dairy-free	3	4.1
Gluten-free	2	2.7
Pescetarian	1	1.4
Vegan	2	2.7
Vegetarian	3	4.1
Vegetarian,Keto	1	1.4
Vegetarian,Pescetarian	2	2.7
Vegetarian,Vegan,Dairy-free	1	1.4
Vegetarian,Vegan,Pescetarian	1	1.4
Whole 30	3	4.1

Qualitative results

To better understand specific opinions and attitudes about food labels and agriculture, qualitative questions were also asked in the survey. In their own words, the participants were asked to define common food labels through four long-form response questions.

The first question, "What does the term 'non-GMO' mean to you?" yielded a major theme and two other accompanying themes. The most common theme, *natural*, included the following responses: "not genetically modified," "organic," "all natural," or "no chemicals." Another common theme was *health and safety*, with students responding something referring to either of these terms. A final theme suggested that the term was *marketing plo*y, in which participants defined the label as only being used for the companies to take advantage of consumers. For example, a participant wrote, "Nothing, because all of our crops are products of GMO methods, even ones that claim they are. 'Non-GMO' makes me think 'no pesticides' or 'no growth hormones,' but not the traditional definition of GMO."

The second question asking, "What does the term 'organic' mean to you?" had a major theme, as well as two additional themes. The main theme was *no human or chemical intervention with production practices*. Several of the answers included the following: "no pesticides," "healthy," "non-GMO," "fresh," or "no chemicals," or "stricter standards on the growing process." For example, a participant wrote, "Agronomic and animal products produced without any pesticides or herbicides. I also think of the terms regenerative and holistic." Another theme was *expensive* where participants noted the team meant "over-priced," to them. In these responses, the individuals only defined the price, not the standard of the product. A final theme, *marketing ploy*, included "marketing label," "pointless jargon," or "buzzword." These participants indicated, similarly to the first question, that the label was not important to them.

In responses to the third question "What does the term 'all-natural' mean to you?" there was a primary theme and a secondary theme. The major theme was *no human or chemical intervention with production practices*. This theme included the following: "non-GMO," "grown naturally," "no chemicals," "organic," and "healthy." Some participants wrote they thought the label indicated the food was "healthy," but were not sure. For example, a participant wrote, "'All-natural' seems to be a good thing, but I'm not entirely educated on what it truly means." The smaller theme, *marketing ploy,* was similar to the previous questions, indicating that the label was used only for marketing. Common terms used were the following: "buzzword," "pointless jargon," and "marketing term."

The fourth question, "What does the term 'sustainably-produced' mean to you?" yielded a primary theme with three other secondary themes. The major theme was *positive impact on the environment.* Most responses associated this term with the following: "environmentally friendly," "responsible farming practices," "what is taken is replaced," "zero waste," and

"efficient." For example, a participant wrote, "The food was grown or made using environmentally friendly methods." In some of the answers, participants indicated what they thought the term meant and also added that the labeling can be fabricated or fake. This secondary theme was noted as *marketing ploy*. For example, one participant noted the labeling was "less than honest." However, only two responses indicated that this label was a "buzzword," or "jargon." Another participant indicated that this term meant *GMOs,* which could be considered to be an additional secondary theme. The participant wrote, "GMOs are the most sustainable way to feed the planet. Sustainable means GMO and not organic. Organic and GMO will be the destruction of sustainability." Among these terms there is overlap between the ideas of safe, healthy, or profit driven.

Conclusions

From the qualitative results, it can be determined that many students are somewhat hesitant about agricultural practices, as well as choosing certain food labels or products. These responses also suggest unclear understanding of some agricultural practices and food labels. It should be noted that three of the classes who received the survey were housed in the College of Food, Agricultural, and Environmental Science (CFAES), which could have influenced participant answers. Since many CFAES students have an agricultural background, they would be familiar with some of these terms and ideas that other students may not be as aware of, which could impact both qualitative and quantitative responses.

In terms of qualitative questions regarding the organic label, many students defined it as meaning "no pesticides." This answer is interesting because USDA organic-certified agriculturalists actually can use some approved synthetic substances, although the majority of their pesticides are naturally derived. Another question, "If you were buying organic foods, how much more would you be willing to pay? (Compared to conventionally produced foods)," found the highest percentage (52.7%) of respondents indicated they would pay 5% more. This finding was important to note because many consumers typically focus on price when shopping, so this label must be meaningful to the consumer if they would be willing to pay more. However, in another question, "On a scale of 1-5 (1 being very important and 5 being least important), how important is buying an organic food label for you?" The highest percentage of participants responded to was the answer 5, indicating it is not important. The next highest was 3, showing a neutral opinion. The first question distinguishes organic versus conventionally-produced food and is more centered around price. The second question focuses specifically on how important buying organic products is to the demographic. These findings are interesting because participants noted that organic foods are worth a higher price to them, yet it is not important for them to buy these products. These responses are most likely due to the financial hardship college-aged students typically experience. This data could tell agricultural communication professionals that, although this demographic tends to buy conventionally-produced products, they do value the organic label.

Likert questions also show varying views of agriculture. For example, in one area participants said farmers were trustworthy, yet in another area they indicated they thought pesticides were unsafe. This could suggest that these students trust people and not the practices. Marketing and communication professionals in the agricultural sector should focus on showing the farmers, or people behind the process in the media they produce. By knowing who is creating their food, these students can better trust the final food product.

Questions regarding eating regimens and food labels also produced a variety of results, suggesting some students look more for labels than others. In terms of looking for food labels, many students indicated that "Locally Grown" or "Sugar-free" was important to them. Other labels or a combination of labels were also noted, suggesting students do look for labels in grocery stores or while shopping for food. When the label "Other" was selected, students responded with "Sale," "None," or "Allergy Information." It seems many students may compare *health versus price* or *locally grown versus corporately produced* in these buying decisions.

With this information, agricultural communicators should continue to focus on using the farmer to address consumer concerns—since consumers indicated they trust farmers. In terms of labeling, students seemed to be more interested in food labels regarding health and wellness or sustainability. Although some consumers noted they thought these labels could be deceiving, the majority of the students seemed to find the labels helpful. This information, in whole, can help agricultural communicators to better understand this demographic and how to better market products for them. This research can also help all agriculturalists or agricultural companies, so consumer preferences can be better understood for this demographic regarding food products.

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